



National Transportation Safety Board Aviation Accident Final Report

Location:	Jackson Hole, WY	Accident Number:	WPR13FA405
Date & Time:	09/11/2013, 1155 MDT	Registration:	N820RV
Aircraft:	KAMTZ RV-7A	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot, who was also the owner/builder of the experimental kit airplane, departed for a cross-country flight from his home airport. Witnesses reported that, following departure, they observed the airplane climb to about 500 to 600 ft above ground level while it was maneuvering onto the downwind leg. Witnesses also reported that the engine was producing abnormal sounds and appeared to lose power. While on the downwind leg, the pilot declared an emergency and indicated that the engine had lost power; the air traffic controller then cleared the airplane to turn right onto the base leg and land. Witnesses reported that, as the airplane was turning from the downwind to the base leg of the traffic pattern, a wing dropped and that the wings were then nearly perpendicular to the terrain. Given the reported wind speeds, the airplane would have encountered a 13- to 20-knot tailwind on the downwind leg and up to 20-knot right crosswind gusts while on the base leg. The tailwind would have resulted in a groundspeed that was much higher than the airspeed, and the pilot likely did not recognize that the airspeed was low. The airplane subsequently made a rapid descent and impacted terrain in a nose-low attitude. Ground scar analysis and wreckage fragmentation revealed that the airplane descended in a steep 45-degree, nose-down attitude before it impacted terrain, consistent with a loss of airplane control. A postimpact examination of the engine revealed no evidence of mechanical malfunctions or failures that could have precluded normal operation. The fuel system sustained too much fragmentation to determine if any malfunctions or failures had occurred.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power for reasons that could not be determined because postaccident examination revealed no mechanical malfunctions or failures that would have precluded normal operation. Also causal was the pilot's failure to adequately compensate for the wind conditions, which resulted in his failure to maintain adequate airspeed and his subsequent loss of airplane control while maneuvering within the traffic pattern for landing.

Findings

Aircraft	Engine (reciprocating) - Failure Airspeed - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause)
Environmental issues	Gusts - Response/compensation (Cause) Tailwind - Response/compensation (Cause) Crosswind - Response/compensation (Cause)
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

HISTORY OF FLIGHT

On September 11, 2013, about 1155 mountain daylight time, a single-engine experimental Kamtz Vans RV-7A, N820RV, experienced a loss of power and departed control flight while the pilot was maneuvering in the traffic pattern at the Jackson Hole Airport, Jackson Hole, Wyoming. The private pilot and passenger were fatally injured. The airplane was registered to and being operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91. The personal flight originated from Jackson Hole with a planned destination of Fort-Collins-Loveland Municipal Airport, Fort Collins/Loveland, Colorado. Visual meteorological conditions prevailed and no flight plan had been filed.

The pilot had departed Whitefish, Montana earlier in the day and was refueling at Jackson Hole. He intended to fly back to Fort-Collins/Loveland, where the airplane was based.

Numerous witnesses located at the airport and near the accident site observed the airplane maneuvering in the traffic pattern. A majority of them stated that the airplane initially departed from runway 01 and climbed to between 500 to 600 feet above ground level (agl) while making a right turn onto the downwind leg. Several witnesses heard the engine producing abnormal sounds that were described as a multiple high revving sequences and a sputtering/popping noise akin to the engine misfiring. The engine appeared to either lose partial or total power. The witnesses said that at that time, the emergency airport siren sounded.

The witnesses further recalled that while the airplane was turning from the downwind to the base leg of the traffic pattern (a right bank from south to west), a wing dropped and the airplane's wings were near perpendicular to the terrain. The airplane subsequently made a rapid descent and impacted terrain in a nose-low attitude.

The Jackson Hole Air Traffic Control Facility recorded radio communications between the pilot and the controller. Shortly after departing runway 01, the airplane entered the downwind leg of the traffic pattern and the pilot stated "Jackson tower eight-two-zero-romeo-victor, I just lost my... lost power here." The controller responded by clearing the airplane to make a right turn onto the base leg and land on runway 01 to which the pilot responded with his last transmission "eight-two-zero-romeo-victor."

PERSONNEL INFORMATION

A review of the airmen records maintained by the Federal Aviation Administration (FAA) disclosed that the pilot, age 67, held a private pilot certificate with airplane rating for single-engine land and instrument flight. He also held a Repairman Experimental Aircraft certificate. His most recent third-class medical was issued on September 30, 2011, with the limitation that he must wear lenses for distant vision and have glasses for near vision to exercise the privileges of his certificate.

According to the pilot's flight logbook he had about 1,150 hours of total flight experience, of which about 850 in the Van's RV-6A and about 350 hours in the RV-7. The pilot was a member of the Experimental Aircraft Association (EAA) and had built the airplane.

AIRCRAFT INFORMATION

The Vans RV-7A is an amateur-built experimental airplane that is sold as a kit. The low-wing airplane was equipped with two seats, fixed tail-wheel landing gear, and traditional flight control surfaces. The accident airplane, serial number (s/n) 72751, received a special airworthiness certificate in the experimental category for the purpose of being operated as an amateur-built aircraft in August 2008.

According to the aircraft maintenance records, the airplane had accumulated a total time in service of 287.0 hours. The most recent condition inspection was recorded as completed by the pilot on October 3, 2012. The build logs were not provided to investigators and therefore it could not be determined if a stall warning system was equipped on the airplane.

The airplane was equipped with an experimental Lycoming IOX-360-A41N engine, s/n 407040. The engine was outfitted with a G3i forced induction supercharger kit. The supercharger was mounted to the engine's vertical draft sump. The supercharger system was driven from the flywheel, through the alternator via a serpentine belt. The compressor was a mechanical, belt driven system that utilized a pair of four-lobe, high-helix rotors. In an effort to maximize efficiency during cruise power settings, the supercharger has an integrated bypass valve that is vacuum controlled. This vacuum operated system was designed to allow air to bypass the supercharger and the rotors to spin freely under lower manifold pressure requirements.

The airplane's test flight hours were completed in April 2009. Thereafter, the logbooks indicated that the pilot estimated that the airplane's stalling speed in the landing configuration (V_{so}), at a weight of 1,740 lbs and a CG of 81.79 inches aft of datum, was 52 knots.

The airplane was refueled just prior to the accident takeoff with the addition of 29 gallons of 100LL Avgas. The airplane was topped off for both the right and left wings.

METEOROLOGICAL INFORMATION

A routine aviation weather report (METAR) generated by an Automated Surface Observation System (ASOS) in Jackson Hole recorded weather conditions at 1153. It stated: skies clear; visibility 10 miles; wind from 30 degrees true (043 degrees magnetic) at 14 knots, gusting to 24 knots; temperature 70 degrees Fahrenheit; dew point 41 degrees Fahrenheit; and an altimeter setting of 30.30 inHg. Minutes before the airplane departed, the tower controller transmitted to him that the wind conditions were from 040 degrees at 15 knots. Immediately after the accident, the controller transmitted to an incoming airliner that the wind was from 050 degrees at 16 knots gusting to 26 knots.

With the reported wind conditions, on the downwind leg the pilot would have encountered a 13 knot tailwind and 8 knot left crosswind. If the airplane encountered the gusts of 26 knots from 050 degrees, this would equate to a tailwind of 20 knots and left crosswind of 17 knots. As the pilot turned to the base leg (presumably a right turn to 280 degrees), the airplane would have a 17 knot tailwind and 20 knot right crosswind.

WRECKAGE AND IMPACT

The accident site was located on level terrain comprised of hard dirt and brush and located about 3,100 feet from the takeoff threshold for runway 01 on a bearing of about 080 degrees. The first identified point of impact consisted of a crater about five feet long and four feet in diameter, where engine pieces and composite chards were imbedded in the compacted dirt. The main wreckage came to rest with the nose on a heading of about 285 degrees and was

located about 5 feet from the initial crater. The global positioning system (GPS) coordinates for the main wreckage were approximately 44.590556 degrees north latitude and 110.74333 degrees west longitude, at an elevation about 6,450 feet mean sea level (msl). A complete pictorial of the wreckage location and surrounding terrain is contained in the public docket for this accident.

The main wreckage consisted of the major airframe components and the engine; the propeller, canopy and top portion of the cowling were found further down from the debris field. Located in the initial impact crater was an antenna that would normally be situated on the front underbelly; just forward of that were pieces of the exhaust manifold (which were 13 feet aft of where the engine came to rest). There were two similar elongated areas of disrupted dirt that were perpendicular to the main impact crater of the first impact point. The depressions were consistent in size and orientation to that of the wings, which each measured about 10 ft and 3 inches.

MEDICAL AND PATHOLOGICAL INFORMATION

Teton Pathology, P.C., Jackson, Wyoming, completed an autopsy of the pilot. The FAA Civil Aeromedical Institute (CAMI) performed toxicological screenings on the pilot. According to CAMI's report (#201300187001) the toxicological findings were negative for ethanol. Diphenhydramine was detected in liver and urine samples.

TESTS AND RESEARCH

The wings sustained major skin deformation crushing from the leading edge, with the bottom leading edge skin folded into itself, giving it an accordion-type appearance. The crush was nearly uniform through the entire length of the wing. The airplane's crush deformation was consistent with an impact with the terrain at a 45-degree nose low attitude.

The engine was removed from the mounts for disassembly/examination. An external visual examination of the engine revealed that it had sustained crush damage to the bottom of the crankcase, with the majority of damage to the oil sump.

The spark plugs were removed and no mechanical damage was noted; the electrodes and posts exhibited a dark grey coloration, which according to the Champion AV-27 chart the electrodes showed normal operation; the bottom #2 spark plug showed an oily residue. The ignition harnesses were attached from both magnetos to their respective spark plugs. The magnetos were secured to their respective mounting pads. Upon their rotation, investigators observed spark produced at all posts.

Investigators removed the cylinders, which revealed no evidence of foreign object ingestion or detonation. All valves were intact and the internal cylinder domes and piston crowns exhibited similar combustion deposits and coloration.

The oil filter casing had "6-18-13" written on its side indicating that was the date of the engine last oil change. The oil filter was removed and cut open, revealing no particles within the pleat folds. The oil pump was removed and disassembled; the gears moved freely and the internal housing contained oil. There was no evidence of any pre-impact lubrication system contamination.

The Whirlwind 200RV propeller was separated from the engine. The propeller blades remained attached at the hub. The spinner was folded over the propeller hub. One propeller blade was straight with no evidence of rotational forces; the other blade was bent aft with

numerous s-bends.

The fuel selector was found with the handle pointing to the "LEFT" tank position. The fuel filter was clean. The engine driven fuel pump was disassembled revealing the rubber diaphragm had a slight tear, consistent with impact damage. The entire fuel system was too fragmented to establish continuity.

The supercharger was disassembled by applying heat to the outside casing and removing the rotors. The butterfly valve was frozen in a partially open position. The inside casing was dyed dark blue consistent with extended exposure to 100LL Avgas. The bearings rotated freely and no anomalies were noted.

History of Flight

Approach-VFR pattern downwind	Loss of engine power (total)
Approach-VFR pattern base	Loss of control in flight (Defining event)

Pilot Information

Certificate:	Private	Age:	67
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 Without Waivers/Limitations	Last FAA Medical Exam:	09/30/2011
Occupational Pilot:	No	Last Flight Review or Equivalent:	05/06/2013
Flight Time:	(Estimated) 1150 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	KAMTZ	Registration:	N820RV
Model/Series:	RV-7A	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	72751
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	10/03/2012, Annual	Certified Max Gross Wt.:	1800 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	287 Hours as of last inspection	Engine Manufacturer:	AMA/EXPR Lycoming
ELT:	C91A installed, not activated	Engine Model/Series:	IOX-360-A41N
Registered Owner:	On file	Rated Power:	
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	JAC, 6450 ft msl	Distance from Accident Site:	
Observation Time:	1153 MDT	Direction from Accident Site:	8°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	14 knots / 24 knots	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	30°	Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	30.3 inches Hg	Temperature/Dew Point:	21° C / 5° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Jackson Hole, WY (JAC)	Type of Flight Plan Filed:	None
Destination:	Loveland, CO (FNL)	Type of Clearance:	VFR
Departure Time:	1150 MDT	Type of Airspace:	

Airport Information

Airport:	Jackson Hole Airport (JAC)	Runway Surface Type:	Asphalt
Airport Elevation:	6451 ft	Runway Surface Condition:	Dry
Runway Used:	01	IFR Approach:	None
Runway Length/Width:	6300 ft / 150 ft	VFR Approach/Landing:	Forced Landing; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	43.590556, -110.743333 (est)

Administrative Information

Investigator In Charge (IIC):	Zoe Keliher	Report Date:	07/07/2015
Additional Participating Persons:	Bruce Hanson; FAA FSFO; Casper, WY		
Publish Date:	07/07/2015		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=88029		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).